

Marketization Level, Debt Maturity and Expense Stickiness of Chinese Listed Companies: Analysis Based on Fixed Effect Model

Man Wang* Hao-yang Yu Tanveer Ahsan

School of Accounting, Dongbei University of Finance and Economics, 217 Shahekou District Jianshan Street,
Dalian 116025, China

*E-mail of the corresponding author: manwang@dufe.edu.cn

Abstract

Expense stickiness is the phenomenon that the marginal rate of change of expense is different when the volume changes in different directions. It can be regarded as a form of agency cost. Both the debt financing and the external environment of the companies are important corporate governance mechanism and can play a role of inhibition on agency cost. With the data of listed companies from Shanghai Stock Exchange(SSE) and Shenzhen Stock Exchange(SZSE) in China, this paper finds that expense stickiness exists in the listed companies in China. We also observe that the shorter listed companies' debt maturity can inhibit the cost stickiness. At last, this paper shows that the lower marketization level of the place the listed companies are located in, the stronger the debt maturity's inhibiting effect on expense stickiness is. This result also suggests the substitution between the debt maturity and the marketization level. Strengthening cost management and rationalizing the maturity of debt are two important issues of Chinese companies. Hence, putting cost stickiness and debt maturity into a research framework has a significant guiding meaning.

Keywords: Marketization level; Debt maturity; Expense stickiness; Fixed effect model

1.Introduction

In management accounting, the traditional cost behavior assumption indicates that there is a linear relationship between volume and cost(Noreen, 1991). This relationship can be expressed with the formula: $y = a + bx$. In this formula, "a" stands for fixed cost and "b" stands for variable cost. As showed in this assumption, regardless of the upward or downward movement of the volume, the marginal rate of change of cost remains "b". In other words, the change of cost along with the change of volume is symmetry. On the contrary, doing an empirical research, Anderson et al.(2003)found that the rising range of SG&A costs along with the upward movement of volume is bigger than the falling range of the costs along with the isometric downward movement of volume. The relationship between the change of cost and volume is asymmetrical and they named it "cost stickiness". Compared with other areas of the management accounting, because of the easy availability of the data, the empirical research about cost management attracts a large number of scholars. Meanwhile, based on the academic research of cost management, we can also open the "black box" of the practice of enterprise cost management further.

Jensen and Meckling(1976)pointed out that there was different between the goals of shareholders and managers and it could lead to agency conflicts and agency cost. Anderson et al.(2003)viewed cost stickiness as a form of agency cost. So, firstly, this paper will make a theoretical analysis on the existence of expense stickiness based on the agency theory and empirically examine it with the fixed effect model. Secondly, corporate governance is an effective form to solve agency conflicts and inhibit agency cost. But existing literature is mostly focused on ownership structure, board structure. Both Williamson(1998)and Fama(1990)thought that the corporate's debt financing was also an important corporate governance mechanism. Aiming at the Chinese listed companies, Zuo-ping Xiao(2006) and Yuan-cheng Hu and Ming-yan Liu (2011)indicated that the short-term debt occupied the vast majority of proportion in the debt financing. Thus, this paper will view debt maturity as another governance mechanism and study if it can play an effective role in inhibiting expense stickiness. At last, broadly, the company's external market environment is also an ignorable component of corporate governance mechanism. External market environment includes capital market, product market, legal environment, etc(Wei-an Li (2005), Chong-en Bai et al.(2005)). We will use marketization level to represent them. China is a large country with 960 square kilometers of land area and there are large differences in development level between different areas. All of these provide the realistic conditions to research the impact of regional difference on the behavior of listed companies.

To sum up, this paper will put marketization level, debt maturity and expense stickiness into a framework. Based on the examine of the existence of expense stickiness, this paper will test the inhibiting effect of debt maturity on expense stickiness and the impact of marketization level. Through the study of this paper, we want to not only discover the expense stickiness status of Chinese listed companies, but also find out a new way to reduce agency cost and inhibit expense stickiness.

2. Related literature

2.1 Expense stickiness

Anderson et al.(2003)was the first empirical research on cost stickiness. From then, many scholars have been studying the causes of expense stickiness. From the aspect of theoretical analysis, Zheng Sun and Hao Liu (2004) reduced the causes to contract perspective, efficiency perspective and opportunism perspective. Based on the new institutional economics, Shou-yi Wan and Hong-jun Wang (2011) explained the causes from transaction cost theory, principal-agent theory and incomplete contract theory. They also thought these three theories were not isolated and could come down to incomplete contract theory.

The theoretical analysis above indicates that agency cost due to the conflict of the different goals of shareholders and managers is one of the causes of expense stickiness. In some empirical researches, Zheng Sun and Hao Liu(2004)used Chinese listed companies' data and found that only opportunism perspective had a significant explanatory ability for expense stickiness and both contract perspective and efficiency perspective didn't have this ability. Chen et al.(2012)showed that managers had the motivation to control more resources by building a "business empire". This kind of behavior could aggravate expense stickiness and when there is some weakness in corporate governance mechanism, it could have a more serious consequence.

Aiming at the phenomenon that agency cost causes expense stickiness, existing literature have done some research about the inhibiting effect of corporate governance mechanism on expense stickiness. Calleja et al.(2006)compared the different of expense stickiness in four countries, the United States, Britain, France, Germany. They found that expense stickiness is bigger in France and Germany than that in the United States and Britain. They further explained it as the result of different corporate governance mechanism and different supervision strength to managers. Respectively, Jing-tao Ma (2008)selected ownership concentration and ratio of independent directors and Shou-yi Wan and Hong-jun Wang (2011)selected the separation of board of directors and general manager and ratio of independent directors as the proxy variables of corporate governance mechanism. Both of them found that the corporate governance mechanism could inhibit expense stickiness. In addition, from the aspect of performance assessment(Chang-chun Yu and Ze-jiang Zhou(2009), Xiao-xue Cao et al.(2009)), cross-listing(Xue-gang Cui and Jin-liang Xu(2013)), audit quality(Shang-kun Liang et al.(2015), Hong Luo and Yong-liang Zeng (2015)), salary incentive(Jian-ying Zhang and Jiao Wang (2015), Hong Luo et al.(2015)) and internal controls(Shao-hong Mou et al.(2015)), existing literature also has tested the above factors' inhibiting effect on expense stickiness.

2.2 Debt governance

Jensen and Meckling(1976)pointed out that there was agency cost both between shareholders and managers and between creditors and shareholders. At the same time, they also indicated that debt financing could increase the relative shareholding of managers and reduce the agency cost. This viewpoint made scholars pay attention to debt governance. Jensen(1986)considered that debt financing could restrict the free cash flow by compelling managers to repay the capital and interest on schedule. This restriction could reduce over-investment and perks. Qin-fu Huang and Hong-bo Shen (2009)selected manufacturing industry listed companies as the samples and found the increasing of debt financing can inhibiting over-investment and business credit had a stronger inhibiting effect than bank load and the extension of debt maturity couldn't play a better role of inhibiting over-investment. Jun Huang and Ni Huang(2012)got the same conclusion with the data of real estate industry. In the aspect of perks, Yu-ting Pan and Jun Bai(2014)found bank load could inhibit perks significantly. Based on classification of debt by maturity and source, Heng-feng Zhang et al.(2015) tested the different inhibiting effect of different forms of debt financing.

Some of scholars also have researched the relationship between debt governance and expense stickiness. Jin-rong Fang et al.(2014)examined the inhibiting effect of bank load and business credit on expense stickiness and gave the evidence that bank load had a stronger effect. Shang-kun Liang(2015)indicated that managers' overconfidence could influence expense stickiness. Then, it also found the shorter maturity of debt had a stronger restriction on the relationship between managers' overconfidence and expense stickiness. Sheng-bao Zhai(2015)viewed the relationship between banks and companies as a supervision mechanism and found that this relationship could reduce the self-interest behavior of managers and inhibit expense stickiness ultimately. Further speaking, this inhibiting effect was stronger in state-owned enterprise and after the financial crisis. In short, the different source and different maturity of debt financing has the discriminatory inhibiting effect on the different forms of agency cost, such as over-investment, perks, expense stickiness, etc.

2.3 Marketization level

Marketization level as the external environment of companies can influence debt financing and cost management of companies at the same time. In the respect of debt financing, Zuo-ping Xiao and Li Liao(2008)viewed the share issue areas as the proxy variable of external environment and found that because of the higher marketization level of overseas capital markets, the companies would have a lower proportion of short-term debt,

when they issued their shares in the overseas capital markets. They thought that there was a substitution between external governance and debt governance. On the other hand, Chan-ping Chen(2008)divided China's land into east part, middle part and west part based on economic ecology and compared the expense stickiness between different parts. It found that expense stickiness in east part was the least and expense stickiness in west part was the most. Teng-yao Wang et al.(2014)selected the companies of manufacture industry from Pearl River delta economic zone, Yangtze River delta economic zone and Ring-Bohai economic zone respectively and gave the evidence that expense stickiness existed in all of the three economic zones. Further, they pointed out that expense stickiness in Pearl River delta economic zone was the most and expense stickiness in Yangtze River delta economic zone was the least. Chang Liu and Qing-yue Tan(2013)analyzed the influence of agency cost both between shareholders and managers and between creditors and shareholders on expense stickiness and tested the govoernance effect of marketization level on the influence of agency cost. Zhen-yang Zhao(2014)provided evidence that the higher the marketization level of factor market was, the smaller the expense stickiness was. In a word, expense stickiness is usually smaller in the place which has the higher marketizaiton level. It can illustrate that the marketization level can also inhibit expense stickiness as debt financing do. Hence, the relationship between debt financing and marketizaiton level in inhibiting expense stickiness is one of the concerns of this paper.

3.Hypotheses development

3.1Existence of expense stickiness

One of the most remarkable features of modern companies is the separation of ownership and management. As usual, the goals of managers are different from those of shareholders. Shareholders pursue the higher value of companies. In contrast, managers want to control more resource and get a higher salary and benefits. Because of the conflicts of the different goals of shareholders and managers, managers will have the opportunism motivation in the process of operating companies and meet the needs of their own at the cost of shareholders' benefits. Cost management is one of the most important managements which are controlled by managers. When the revenue increases, according to free cash flow theory, managers have the motivation to use the free cash flow to build "business empire". By this way, managers can control more resource and improve their reputation and get more salary and perks. In contrast, when the revenue decreases, managers will guarantee their own benefits firstly. They maybe won't stop building "business empire" or getting high salary and perks. These actions will make the cost remain in a high level in spite of the decreasing of revenue. In addition, when the companies' revenue decreases or the companies are facing to some adverse shocks, the companies will have to bear high adjustment cost of modifying the existing contract or signing a new contract. Managers will remain expense spending on the pretext of adjustment cost. Based on the analysis above, this paper thinks that because of the conflicts of the goals of shareholders and managers, there is agency cost between them. When the revenue decreases, managers' won't reduce expense immediately. Hence, hypothesis 1 is developed:

H1.Expense stickiness exists in Chinese listed companies.

3.2Debt maturity and expense stickiness

Equity and debt are both two important financing ways for companies and two significant governance mechanism for companies. Shareholders exercise their rights by voting at the shareholder's meeting or sending representatives in the board of directors. In contrast, creditors exercise debt governance mechanism by compelling managers to repay the capital and interest on schedule and restricting the free cash flow. Zuo-ping Xiao(2006)thought that debt maturity was an important decision when companies financed by debt. Different debt maturity also has the different force of constraint. Hart and Moore(1995)pointed out that the governance mechanism of short-term debt was pushing the companies into the bankruptcy and liquidation proceeding or restricting the free cash flow and the governance mechanism of long-term debt was controlling managers or limiting their infinite expansion. In the aspect of the force of restricting the free cash flow, short-term debt was claimed for reimbursement in a short run. It would establish an stronger restriction on the free cash flow. The companies would have to be in the bankruptcy and liquidation proceeding, when they couldn't repay their debt on time. According to the transfer control model proposed by Aghion and Bolton(1992), if the companies were in the bankruptcy and liquidation proceeding, the right of controlling companies would transfer from managers to creditors and managers would lost their salary and perks at the same time. In the aspect of the components of debt, short-term debt includes "payroll payable" and "tax payable". These components obtain the restriction on managers' behavior not only from the contracts, but also from relevant laws. So, with a shorter debt maturity, managers will reduce the expense spending immediately, when the revenue decrease. Based on the analysis above, this paper predicts that the shorter debt maturity can have a stronger restriction on managers' behavior and will inhibit expense stickiness which is caused by agency cost. Hence, we develop the hypothesis 2:

H2:The debt maturity of listed companies has an inhibiting effect on expense stickiness. The shorter the debt maturity of listed companies is, the smaller expense stickiness is.

3.3 The impact of marketization level

Both cost management and financing decision are internal actions of companies and their effectiveness and efficiency will be influenced by companies' external environment. The marketization level is an important proxy variable of companies' external environment. The marketization level can express in many aspects, such as capital market, factor market, manager market, intermediary agency of market, laws and regulations, etc. When companies are in a developed capital market, they can finance easily. The performance evaluation of the company by capital market collectively can replace the supervision of creditors and reduce the debt governance effect. A high-efficiency factor market can make a result of more efficient allocation of resource between companies and leave managers a small space to control more useless resource with opportunism motivation which will lead to lower efficiency. Managers who are in a better manager market will face the tougher competition when they want to get or keep a position in the company. This competition will compel the managers to do their best to achieve the goals of shareholders instead of themselves. In addition, intermediary agency of market and laws and regulations are a safeguard mechanism which will makes contracts be formulated and performed more efficiently. On the one hand, companies will make an accurate judgment about future with the help of intermediary agency. On the other hand, creditors can use the perfect laws and regulations to protect themselves by restricting managers' self-interest behavior. Based on the analysis above, marketization level also can play a role of reducing agency cost and inhibiting expense stickiness. This paper predicts a substitution between debt maturity and marketization level in inhibiting expense stickiness. Hence, hypothesis 3 will be developed as follows:

H3: The lower the marketization level of the place where the listed companies locate is, the stronger the inhibiting effect of debt maturity on expense stickiness is.

4. Research design

4.1 Variables and models

4.1.1 Dependent variable

Consistent with Anderson et al.(2003), Zheng Sun and Hao Liu (2004), this paper takes selling expense and administration expense as the research object and examines its stickiness. We will also use the logarithmic models which measure the change rate of the expense with the natural logarithm of the ratio of the expense of current year to that of last year. The models can reduce the influence of heteroskedasticity by changing the order of magnitudes of relevant variables.

4.1.2 Independent variables

Firstly, we measure the change rate of revenue in the same way in which we measure the change rate of selling expense and administration expense. Secondly, the direction of the change of revenue is a dummy variable. When revenue decreases, the dummy variable will be with a value of 1. Thirdly, the weighted average debt maturity and the ratio of current liabilities to total liabilities are two main measures of debt maturity. For the availability of data, we choose the second way to measure debt maturity. A higher rate stands for the shorter debt maturity. In addition, to avoid endogenous, we use the lagged date of debt maturity in the regression models. Finally, we evaluate marketization level according to 《NERI INDEX of Marketization of China's Provinces 2011 Report》(Gang Fan et al.(2011)). There are one aggregative index and five sub-indexes in that report¹. This paper chooses the aggregative index in the empirical analysis and sub-index of the development of intermediary agency and the environment of laws and regulations in the robustness test. We will use the data of marketization in 2009 which is the newest in that report and the closest to the data of other variables. This method has some rationality on account of the stability of relative marketization of different provinces in China. Moreover, we just view the marketization as a variable which will divide the total samples into two groups.

4.1.3 Control variables

Banker et al.(2010) reduced the influence factors of expense stickiness into adjustment cost, the optimistic expectation of managers and agency cost. This paper views expense stickiness as a form of agency cost. To control the influence of other factors, we add capital intensity and macroeconomic condition in the logarithmic models. They can be proxy variables of adjustment cost and the optimistic expectation of managers² respectively.

The concrete form of the variables is showed in Table 1 as follows.

4.1.4 Model design

Based on the classic logarithmic model built by Anderson et al.(2003), we construct some models according to the special content of this paper. To test H1, model1 is constructed as follows:

¹Five sub-indexes are the relationship between government and market, the development of non-state economy, the development of product market, the development of factor market and the development of intermediary agency and the environment of laws and regulations.

²Labor intensity usually be measured with the ratio of payroll payable to revenue. Payroll payable is the important component of current liabilities. To avoid multicollinearity, we don't put labor intensity into models.

$$\ln \frac{SG \& A_{i,t}}{SG \& A_{i,t-1}} = \beta_0 + \beta_1 \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}} + \beta_2 \times D_{i,t} + \beta_3 \times D_{i,t} \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}} + \alpha_1 \times AI_{i,t} + \alpha_2 \times GDP_{i,t} + f_i + \varepsilon_{i,t} \quad (1)$$

Different from existing literature, this paper uses the fixed effect model with a panel data. A f_i added into the model stands for the company's unobservable factors which don't change with the time. In empirical analysis, we will test the applicability of the models primarily.

If β_3 which we get from the regression of model1 with total sample is less than 0, in other words, $\beta_1 + \beta_3$ is less than β_1 , we will draw a conclusion that when revenue decreases ($D_{i,t} = 1$), the falling range of selling expense and administration expense is less than the rising range along with the increasing of revenue. This result can illustrate that expense stickiness exists in Chinese listed companies and prove H1.

To test H2 and H3, this paper adds the proxy variable of debt maturity into model1 and constructs model2:

$$\ln \frac{SG \& A_{i,t}}{SG \& A_{i,t-1}} = \beta_0 + \beta_1 \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}} + \beta_2 \times D_{i,t} + \beta_3 \times D_{i,t} \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}} + \beta_4 \times STD_{i,t-1} + \beta_5 \times D_{i,t} \times STD_{i,t-1} \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}} + \alpha_1 \times AI_{i,t} + \alpha_2 \times GDP_{i,t} + f_i + \varepsilon_{i,t} \quad (2)$$

If a β_5 got from the regression of model2 with total samples is greater than 0, we can illustrate that a shorter debt maturity can inhibit expense stickiness and prove H2. Then, based on the grouping of the total samples according to marketization level, we regress model2 with the different group of samples respectively. If β_5 from the regression with the samples from the places with a higher marketization level is less than that from the places with a lower marketization level, H3 will be proved and the substitution between debt maturity and marketization level will be found.

4.2 Samples and data

This paper selects the Chinese listed companies in Shanghai Stock Exchange and Shenzhen Stock Exchange from 2010 to 2014 as the samples. Because of the usage of the data of lagged period to calculate some variables, the actual collection period is from 2009 to 2014. All of financial data is from the database of CSMAR, marketization level is from 《NERI INDEX of Marketization of China's Provinces 2011 Report》(Gang Fan et al.(2011)) and the data of macroeconomic condition is from the website of State Statistics Bureau¹.

We eliminate the samples belonging to financial industry, with the mark of ST or *ST, with the missing data and outliers. Finally, we get a panel data of 1420 companies in 5 years. The number of total samples is 7100. Then, we use marketization level of different provinces to divide the total samples into two groups. The samples located in the provinces which has a marketization level ranking from 1 to 15 belong to high-marketization level group(H group), others belong to low-marketization level group(L group).The number of H group and L group are 5640 and 1460.

We eliminate and arrange the samples with Excel2007 and do empirical analysis with Stata12.

5. Empirical results

5.1 Descriptive statistical analysis

The result of the descriptive statistics of the total samples will be showed in Table2 as follows.

From Table2, the mean and median of $\ln \frac{SG \& A_{i,t}}{SG \& A_{i,t-1}}$ and $\ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$ are all greater than 0. This result illustrates both expense and revenue increase in this period. The mean of the dummy variable is 0.255 and also can show a overall upward trend of revenue. Debt maturity's mean and median are 0.815 and 0.880. This result is similar to that of Zuo-ping Xiao(2006) and Yuan-cheng Hu and Ming yan Liu(2011).It shows that the main way of debt financing for Chinese listed companies is still current liabilities. This is one of the reason why we research the debt governance from the angle of debt maturity. The mean and median of capital intensity is 2.389 and 1.726. There is a large gap between the min(0.107) and max(14.175) of capital intensity. GDP's mean is 8.5% and median is 7.67%. As a proxy variable of macroeconomic condition, it represents a faster development phase of Chinese economy during this period.

5.2 Multiple regression analysis

We test the hypotheses with a panel data, so we will examine the applicability of different forms of model primarily. Table3 displays the result of F test and Hausman test.

We use F test to examine whether the panel data is with hybrid effect of random effect and the result is showed in Column2 of Table3. Because all of "P" got from different models and samples which we will use are less than significance level, we can reject the null hypothesis "the panel data is with hybrid effect". Then, the

¹The website of State Statistics Bureau is <http://www.stats.gov.cn/>

result of Hausman test in Column3 tells us that the panel data is fit for the fixed effect model.

Regress the fixed effect model to examine H1 and H2 and the result is showed in Table 4 as follows.

The result in Column(1)and(2) in Table4 demonstrates that expense stickiness exists in Chinese listed companies no matter we regress the model with control variables or not. Specifically, β_1 in Column(2) is 0.507 and has significance at the 1% level. When revenue increases by 1%, expense increase by 0.507%. At the same time, β_2 is -0.419 and has significance at the 1% level. Thus, when revenue decreases by 1%, expense decreases just by 0.088%(0.507%-0.419%). We can draw a conclusion that expense has a smeller change range along with revenue decreasing than that along with revenue increasing. So, we can prove H1 with the evidence above.

Column(3)and(4)report the regression result about the inhibiting effect of debt maturity on expense stickiness. The falling range of expense along with revenue decreasing by 1% is $(\beta_1 + \beta_2 + \beta_5 \times STD_{it-1})\%$. β_5 is 0.410 and 0.399 respectively and both of them have significance at the 1% level. Because β_5 is greater than 0, when debt maturity becomes short, in other words, STD_{it-1} becomes bigger, the falling range of expense will be larger, too. This result gives the evidence that debt maturity can inhibit expense stickiness. Thus, H2 has been proved.

To test the influence of marketization level as a proxy variable of external environment on the debt maturity's inhibiting effect on expense stickiness, we regress model2 with the samples of H group and L group respectively and display the result in Table5.

The regression results of β_5 with H group is 0.073 and 0.049, which are reported in column(1) and (2) of Table5.Both of them are not significant. These results shows that when the companies are located in a place which has a higher marketization level, their debt maturity doesn't has a significant inhibiting effect on expense stickiness. On the contrary, the results of β_5 with L group in Column (3) and (4) of Table5 are 0.881 and 0.888 and have a significance at the 1% level. It illustrates that debt maturity of the companies located in a lower marketization place has a stronger inhibiting effect on expense stickiness. Thus, H3 can be proved and the substitution between debt maturity and marketization level can also be found.

5.3 Robustness tests

To make the conclusions of this paper steady and reliable, we will do some robustness tests. Primarily, we take off the non-current liabilities due within one year from current liabilities. Debt maturity is measured with the ratio of current liabilities minus non-current liabilities due within one year to total liabilities. We can distinguish current liabilities and non-current liabilities from the source in this way.

Then, we choose the sub-index of the development of intermediary agency and the environment of laws and regulations in the report as the grouping variable. In this way, the number of samples in H group is 5736 and in L group is 1365. Table6 reports the results of the robustness tests.

The results in column(1)(2)and(3) of Table6 are from the regressions that we use the ratio of current liabilities minus non-current liabilities due within one year to total liabilities to measure debt maturity. β_5 in column(1) is 0.324 and has a significance at the 1% level. H2 can be proved again. It demonstrates the inhibiting effect of debt maturity on expense stickiness again. β_5 in column(2) is 0.089 and not significant. On the contrary, β_5 in column(3) is 0.853 and has a significance at the 1% level. By comparison, this result also can prove H3.

We select the sub-index of the development of intermediary agency and the environment of laws and regulations in the report as the grouping variable and get the result which is showed in column(4)and(5) of Table6. With the H group, β_5 in column(4) is 0.112 and isn't significant. But with the L group, β_5 is 0.964 and has a significant at 1% level. As mentioned above, it can give a clear evidence to support H3 again.

6. Conclusion

With the panel data of 1420 Chinese listed companies from 2010 to 2014, this paper uses the fixed effect model to do an empirical analysis and get some conclusions. Controlling the capital intensity and macroeconomic condition, this paper shows that expense stickiness exists in Chinese listed companies again. This result is similar to some existing literature. Then, under the background that Chinese listed companies have a large proportion of short-term debt, debt maturity is tested to have governance effect and can inhibit expense stickiness which is caused by agency cost. The shorter debt maturity is, the smaller expense stickiness is. On this basis, this paper also demonstrates the substitution between debt maturity and marketization level. Debt maturity of the companies which are located in the place with a lower marketization level has a stronger inhibiting effect on expense stickiness.

Combined with the conclusion above, we also put forward some suggestions about Chinese listed companies and building Chinese socialism market economy system. Firstly, cost management is an important content of companies' internal management. Companies should enhance their force to control cost and expense and make it be a new core competitiveness in the increasing fierce competition environment. From the aspect of financing way, the listed companies rely on equity financing more than debt financing. In the internal of debt

financing, the main way is short-term debt and bank loan. Although the short-term debt also has the governance effect, establishing and perfecting the corporate bond market gradually and meeting the corporate need of financing is imminent, too. At the same time, the awareness of protecting the legal interest of creditors should be cultivated and debt governance mechanism also should play a vital role in a greater scope. Lastly, the marketization level is also an important corporate governance mechanism. It can also reduce the agency cost and protect the interest of investors. Because of the course of history and resource distribution, etc, there is a huge difference between the marketization level of different areas in China. We should raise the marketization level of underdeveloped areas and make it play a complementary role with other governance mechanism.

There are some potential directions in the future research. On one hand, we view selling expense and administration expense as a whole. The difference of the impact of debt maturity on the two kinds of expenses should be studied. On the other hand, we also should investigate the effect of debt on cost stickiness from the other perspectives, such as debt sources.

Acknowledgments

This paper represents some of the results of the National Planning Office of Philosophical and Social Sciences Research Project of China (Project Number“15BGL058”).

References

- Noreen E. 1991. Conditions under which activity-based cost systems provide relevant costs. *Journal of Management Accounting Research*, 3:159-168
- Anderson M.C., Banker R.D., Janakiram S.N. 2003. Are selling, general, and administrative costs “sticky”. *Journal of Accounting Research*, 1: 47-63
- Jensen M.C., Meckling W. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 4:305-360
- Williamson Oliver. 1988. Corporate finance and corporate governance. *The Journal of Finance*, 43: 567-591
- Fama E. 1990. Contract costs and Financing decisions. *Journal of Business*, 63: 71-79.
- Zuo-ping Xiao. An overview of corporate debt maturity structure. *Securities market herald*, 11:70-77
- Yuan-cheng Hu, Ming-yan Liu. 2011. The influence factors of debt maturity structure of Chinese listed companies. *Management world*, 2:175-177
- Wei-an Li. 2005. Corporate governance. Beijing: Higher education press
- Chong-en Bai, Qiao Liu, Joe Lu, Frank M. Song, Jun-xi Zhang. 2005. An empirical study on Chinese listed firms’ corporate governance. *Economic research journal*, 2:81-91
- Zheng Sun, Hao Liu. 2004. The expense “stickiness” behavior of Chinese listed companies. *Economic research journal*, 12:26-34
- Shou-yi Wan, Hong-jun Wang. Theoretical analysis of the cause of cost stickiness. *Journal of Hunan finance and economics university*, 8: 83-86.
- Chen C.X., H. Lu, T. Sougiannis. 2012. The agency problem, corporate governance, and the asymmetrical behavior of general and administrative cost. *Contemporary Accounting Research*, 29: 252-282
- Calleja K. M. Stelias, and D. Thomas. 2006. A note on cost stickiness: some international comparisons. *Management Accounting Research*, 17: 127-140
- Jing-tao Ma. 2008. Comparative study on selling expense and administration expense of listed companies: corporate governance. *Market modernization*, 30:66-67.
- Shou-yi Wan, Hong-jun Wang. 2011. Managerial self-interest, board governance and cost stickiness. *Economy and management*, 3:26-32
- Jensen Michael. 1986. Agency cost of free cash flow, corporate finance and takeovers. *American Economic Review*, 76: 323-329
- Qian-fu Huang, Hong-bo Shen. Debt source, debt maturity structure and overinvestment. *Journal of financial research*, 9:143-154
- Jun Huang, Ni Huang. 2012. Overinvestment, debt structure and governance effect: evidence from listed real estate companies in China. *Accounting research*, 9:67-72
- Yu-ting Pan, Jun Bai. 2014. Financial development, bank debt and perks for manager. *Communication of finance and accounting*, 1: 104-106.
- Heng-feng Zhang, Yue Deng, Yu Li, Min Zhou. 2015. The impact of debt contract on managers’ perks. *Communication of finance and accounting*, 35:40-42
- Jin-rong Fang, Ming-hu Wang, Dong-qin Zhong. The study on the inhibiting effect of debt financing on expense stickiness. *Friends of accounting*, 24:36-38
- Shang-kun Liang. 2015. Managers’ overconfidence, debt constraints and cost stickiness. *Nakai business review*, 3:122-131

- Sheng-bao Zhai, Zi-wei Chen, Ya-ping Liu. 2015. Study on the relationship between the banking connection and the cost stickiness. *Systems engineering-theory and practice*, 4:928-938.
- Zuo-ping Xiao, Li Liao. 2008. Dose the governance of companies affect the debt maturity level?. *Management world*, 11:143-156
- Can-ping Chen. 2008. A study on the cost “stickiness” behavior of Chinese listed companies: based on difference region of economic ecology. *The theory and practice of finance and economics*, 11: 92-95
- Teng-yao Wang, Kai-wei Qiu, Wen-ying Dang. 2014. The study of expense stickiness of Chinese manufacturing-listed companies. *Market mordenization*, 33: 161-163.
- Chang Liu, Qing-yue Tan. 2013. Marketization, agency conflicts and expense stickiness. *Journal of Guangxi university of finance and economics*, 4: 12-17
- Zhen-yang Zhao. 2014. The study on Chinese marketization index and expense stickiness. *Price: theory and practice*, 6:62-64
- Zuo-ping Xiao. 2006. An empirical study on Chinese listed companies’ debt maturity structure. *Securities market herald*, 2:51-57
- Hart Oliver, Moore John. 1995. Debt and seniority: An analysis of the role of hard claims in constraining management. *The American Economic Review*, 85: 567-585
- Aghion P., Bolton P. 1992. An incomplete contract approach to financial contracting. *Review of Economic Study*, 59: 473-494
- Gang Fan, Xiao-lu Wang, Heng-peng Zhu. 2011. NERI INDEX of Marketization of China’s Provinces 2011 Report. Beijing: Economic Science Press.
- Banker R., Byzalov D., Plehn-Dujowich J. 2010. Sticky cost behavior: Theory and evidence. *Working Paper*.

Table 1 Variables

Name	Symbol	definition
Change rate of selling expense and administration expense	$\ln \frac{SG \& A_{i,t}}{SG \& A_{i,t-1}}$	Natural logarithm of the ratio of selling expense and administration expense of current year to that of last year
Change rate of revenue	$\ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$	Natural logarithm of the ratio of revenue of current year to that of last year
Direction of the change of revenue	$D_{i,t}$	The dummy with a value of 1 if current revenue decreases, 0 otherwise
Debt maturity	$STD_{i,t-1}$	Ratio of current liabilities of last year to total liabilities of last year
Marketization level	$MAR_{i,t}$	Ranking of provinces in the report
Capital intensity	$AI_{i,t}$	Ratio of total asset of current year to revenue of current year
Macroeconomic condition	$GDP_{i,t}$	GDP of current year

Table2 the result of descriptive statistics

Variable	Mean	Median	Min	Max	Sd
$\ln \frac{SG \& A_{i,t}}{SG \& A_{i,t-1}}$	0.143	0.125	-1.968	3.406	0.247
$\ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$	0.129	0.116	-3.982	3.804	0.344
$D_{i,t}$	0.255	0	0	1	0.436
$STD_{i,t-1}$	0.815	0.880	0.073	1.000	0.190
$AI_{i,t}$	2.389	1.726	0.107	14.175	2.205
$GDP_{i,t}$	8.5%	7.67%	7.4%	10.45%	0.12

Tabel 3 The test of panel data

	P (Prob>F)	Chi2
Model1 (total samples)	0.0052	308.07
Model2(total samples)	0.0039	317.24
Model2 (H group)	0.0003	332.35
Model1 (L group)	0.0087	28.05

Table4 Debt maturity and expense stickiness

	H1		H2	
	(1)	(2)	(3)	(4)
Cons (β_0)	0.057*** (13.89)	-0.090*** (-4.54)	0.026 (1.60)	-0.114*** (-4.63)
$\ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$ (β_1)	0.508*** (43.83)	0.507*** (43.24)	0.511*** (44.16)	0.511*** (43.57)
$D_{i,t}$ (β_2)	-0.017 (-1.53)	-0.003 (-0.45)	-0.014* (-1.81)	-0.006 (-0.76)
$D_{i,t} \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$ (β_3)	-0.470*** (-20.03)	-0.419*** (-17.32)	-0.827*** (-11.36)	-0.766*** (-10.53)
$STD_{i,t-1}$ (β_4)			0.036* (1.89)	0.032* (1.69)
$D_{i,t} \times STD_{i,t-1} \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$ (β_5)			0.410*** (5.18)	0.399*** (5.06)
$AI_{i,t}$ (α_1)		0.019*** (6.22)		0.019*** (6.26)
$GDP_{i,t}$ (α_2)		1.201*** (5.74)		1.160*** (5.55)
R^2	0.322	0.286	0.324	0.288
F	881.24***	548.77***	536.65***	397.36***
N	7100	7100	7100	7100

* and *** indicate two-tailed statistical significance at the 10% and 1% level, respectively. The number in parentheses is the result of T statistic.

Table5 Marketization level, debt maturity and expense stickiness

	H3			
	H group		L group	
	(1)	(2)	(3)	(4)
Cons (β_0)	0.034 [*] (1.88)	-0.089 ^{***} (-3.28)	0.019 (0.52)	-0.196 ^{***} (-3.38)
$\ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$ (β_1)	0.519 ^{***} (40.26)	0.519 ^{***} (39.68)	0.495 ^{***} (19.00)	0.496 ^{***} (18.97)
$D_{i,t}$ (β_2)	-0.009 (-1.04)	-0.002 (-0.28)	-0.021 (-1.18)	-0.004 (-0.22)
$D_{i,t} \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$ (β_3)	-0.564 ^{***} (-5.99)	-0.492 ^{***} (-5.22)	-1.106 ^{***} (-9.06)	-1.057 ^{***} (-8.70)
$STD_{i,t-1}$ (β_4)	0.027 (1.26)	0.022 (1.04)	0.042 (0.94)	0.042 (0.95)
$D_{i,t} \times STD_{i,t-1} \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$ (β_5)	0.073 (0.70)	0.049 (0.47)	0.881 ^{***} (6.95)	0.888 ^{***} (7.05)
$AI_{i,t}$ (α_1)		0.020 ^{***} (5.74)		0.020 ^{***} (3.07)
$GDR_{i,t}$ (α_2)		0.966 ^{***} (4.19)		1.903 ^{***} (3.90)
R^2	0.324	0.285	0.341	0.310
F	433.49 ^{***}	319.91 ^{**}	112.85 ^{***}	85.33 ^{***}
N	5640	5640	1460	1460

* and *** indicate two-tailed statistical significance at the 10% and 1% level, respectively. The number in parentheses is the result of T statistic.

Table6 The result of robustness tests

	Debt maturity			Marketization level	
	Total samples	H group	L group	H group	L group
	(1)	(2)	(3)	(4)	(5)
Cons (β_0)	-0.055 ^{**} (-2.47)	-0.041 [*] (-1.69)	-0.130 ^{**} (-2.53)	-0.052 ^{**} (-2.02)	-0.125 ^{**} (-2.20)
$\ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$ (β_1)	0.501 ^{***} (43.90)	0.510 ^{***} (39.24)	0.487 ^{***} (18.74)	0.514 ^{***} (39.66)	0.476 ^{***} (18.14)
$D_{i,t}$ (β_2)	-0.006 (-0.76)	0.006 (0.74)	-0.010 (-0.56)	0.006 (0.73)	-0.008 (-0.41)
$D_{i,t} \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$ (β_3)	-0.730 ^{***} (-10.62)	-0.498 ^{***} (-5.77)	-1.085 ^{***} (-9.07)	-0.522 ^{***} (-5.63)	-1.187 ^{***} (-9.16)
$STD_{i,t-1}$ (β_4)	0.020 (1.11)	0.013 (0.65)	0.044 (0.041)	0.024 (1.12)	0.037 (0.81)
$D_{i,t} \times STD_{i,t-1} \times \ln \frac{Rev_{i,t}}{Rev_{i,t-1}}$ (β_5)	0.324 ^{***} (4.35)	0.089 (0.92)	0.853 ^{***} (6.95)	0.112 (1.09)	0.964 ^{***} (7.31)
$AI_{i,t}$ (α_1)	0.000 (0.23)	0.002 ^{***} (5.08)	-0.001 ^{***} (-3.45)	0.002 ^{***} (5.19)	-0.001 ^{***} (-3.43)
$GDR_{i,t}$ (α_2)	1.12 ^{***} (5.31)	0.975 ^{***} (4.12)	1.738 ^{***} (3.55)	0.980 ^{***} (4.30)	1.738 ^{***} (3.40)
R^2	0.324	0.331	0.337	0.333	0.336
F	387.76 ^{***}	318.24 ^{***}	84.37 ^{***}	326.64 ^{***}	78.25 ^{***}
N	7100	5640	1460	5735	1365

*, ** and *** indicate two-tailed statistical significance at the 10%, 5% and 1% level, respectively. The number in parentheses is the result of T statistic.